- Figure 9 shows typical waveforms for the circuit of Fig. 4. 24a-d shows four phases of an electronic signal in amplitude versus time plots. A graph of typical wiper rotation of the circular resistive means is shown in 25 and an amplitude versus time plot of the output from 11b, is shown at 26. Plots 24, 25 and 26 have the same time scale, and time points V, W, X, Y and Z have been identified by dashed lines. At time V the wiper is at the 0° position (not to be confused with the 24a 0° phase) which is chosen, for the purpose of explanation, to be located at 10d, therefore, the 270° signal is passed to 11b. At time W the wiper rotates CCW until time X, causing the 0° signal to be output.

At time Y, the wiper again rotates CCW providing a continuous phase shifted output signal until time Z. Note that the continuous phase shift to the output signal causes the frequency of the output signal to change. In the present example, the wiper rotated CCW, thus decreasing the frequency of the output signal. Had the wiper rotated CW instead of CCW, the frequency would have increased. -

Page 11, Line 7, after "used.", Insert: -The multiplier devices would be configured to pass a portion of the applied phase shifted signal by, in effect, varying the impedance from the input to output terminal in response to a control element. In the use of multipliers, a portion may well be an amount greater than the input, due to the presence of a gain stage in conjunction with the multiplier. It will be apparent to one skilled in the art that the operation of the multiplier may or may not include a gain stage, and that the description and claim of portions or

Page 13, before the 1st full paragraph, Insert:

- Figure 10 shows typical waveforms which would be seen for the circuit of Fig. 7. The waveforms of Fig. 10 are also similar to those of Fig. 9, except that the wiper rotation waveform 25 has been replaced with input pulse 29 and Ma - Md (20a - 20d), the same as in Fig. 8. Figure 10 shows input waveform 27 which is input to phase shift means 6e, and outputs 28a - 28d corresponding to ØA - ØD. Output waveform 30 corresponds to the output from 21. It can be seen that the multipliers 17 and control element 23 essentially provide the same function as the circular resistive element and wiper shown in Fig. 4, thereby achieving the phase shift. The operation of Fig. 7 is essentially the same as that of Fig. 4, except that a given phase shifted signal (or portions of two phase shifted signals) is selected by a multiplier 17 in response to 23, whereas in the circuit of Fig. 4, the selection is provided by rotating the wiper. The phase of waveform 30 corresponds to ØD between time V and time W. At time W, Md decreases and Ma increases, and the phase of 30 is the vector sum of ØA and ØD. At time X, 30 has the same phase as ØA. For the time period from Y to Z, the output 30 has a frequency shift. While signals Ma - Md have been shown as triangular in shape, other shapes will also work. It has been found that a half sinusoid shape works well in terms of minimizing distortion on the output signal. There is no requirement that a complete transition from minimum to maximum be made within any given time and these signals may as well be caused to make only a partial change and then stop. -

Page 13, Line 5, after "utilized", Insert: